SOLUTIA WASTEWATER EQUALIZATION FACILITY DESCRIPTION

In co-operation with the Springfield Department of Public Works in 1989 the Solutia Company built an effluent flow equalization and neutralization system at its plant in Indian Orchard. The Solutia plant is a significant contributor of effluent to Springfield's Bondi Island wastewater treatment facility.

Solutia's equalization facility function can be most easily understood as a wide spot in the sewer line (two- one million gallon tanks). By collecting, storing, neutralizing and metering out the mixed effluent, Solutia sends Bondi Island a steadier flow of easier to treat pH neutralizing wastewater.

Facility General Description:

The existing system pumps the Solutia waste effluent, Masspower effluent, and Ineos Nova sanitary effluent, through a force main to the west end of the plant where it combines with the west plant effluent. The combined streams are monitored, screened and controlled for pH. Two – one million gallon tanks in series equalize the BOD, COD and pH variations which occur in the plants' flows before sending the effluent via a line to the Ludlow Interceptor. (The Ludlow Interceptor is the large, underground sewer line running along the Chicopee River beside the plant which collects sewage from upstream communities and directs it to Bondi Island.)

The primary objectives of the equalization system are to meet the wastewater requirements implemented by the City of Springfield Public Owned Treatment Works (POTW) under the Industrial Pretreatment Program and the Sewer Use Ordinances and provide a centralized wastewater equalization facility for the Indian Orchard Site. This facility neutralizes the wastewater to with a pH range of 5.5 to 9.0. The equalization tanks dampen the amplitude of organic peaks from batch discharges through equalization.

The east plant spill diversion area is a pumping station which pumps the east plant wastewater through a force main to a wet well and pumping station in the west plant. The west facility screens solids from the combined east and west wastewater, neutralize the west plant and combined wastestreams as necessary to meet the pH limit, and equalize the combined through wastestreams through two tanks. Each tank contains a nominal volume of 1 million gallons. The tanks are connected in series to obtain a projected hydraulic retention time of 8 hours given the current combined site daily average flow of 5 MGD. Flow, pH, L.E.L., and total carbon analyses are used to monitor the quality of the wastestreams and final effluent as required under the I.P.P. permit. Samples for B.O.D. and T.S.S. will be retained for pickup and analyses by the City and outside laboratory for use in determining our contract billing.

Force Main Details:

The normal east plant effluent flow ranges from 1000 to 2000 gpm. There are two pumps in the east wet well. One pump runs continuously with speed reducer controls and the second modulates off and on when needed to handle fluctuations in flow. A level sensor serves to control the second pump.

From this point the East Plant wastewater is pumped through a pipeline of high density polyethylene (HDP) pipe. The pipeline starts from the existing east plant pump building (72D) and continues to an oversized manhole upstream of the screening area and the equalization pump station in the West Plant, east of 136 Bldg. East plant wastewater combines with the west plant process wastewater in the combination manhole (MH3).

Equalization System Details:

The combined east and west wastewater streams are treated with lime slurry or sulfuric acid and screened by a Weisman-type mechanical screen after flowing through the combination manhole just upstream from the pump station wet well. This first stage of neutralization on the combined wastestreams brings the wastestream up to the minimum limit (pH 5.0 to 5.5) of the permit.

After this first stage of screening and neutralization, the combined wastewater is monitored and neutralized an additional time, if necessary, before discharging into the wet well to be pumped to one of the two equalization tanks. One pump runs continuously and should handle the expected combined baseline flow of 4000 to 4800 gpm. The second pump is speed controlled to assist with any surges in flow production areas and rain events to a maximum flow of 9000 gpm.

Flows in excess of this range will most likely be a significant storm event and the excess above 9000 gpm will discharge over the strait edge overflow weir into an adjacent discharge chamber for the normal outflow from the equalization tanks. Thus, in this rare event a portion of the effluent will bypass the equalization tanks and go directly to the Ludlow Interceptor sanitary sewer line. In no case will effluent flows be allowed to escape this system into the adjacent environment. The combined outflow from the tanks and overflow from any storm event can be measured and recorded in the control building. Controls for starting and stopping the pumps will be in the control building adjacent to the wet well.

In the event of flows greater than 9000 gpm, an informational indicator (flashing indicator, not an alarm) will be activated to notify people in the control room and in the powerhouse that water is discharging over the high flow weir. An alarm indicating pump failure (no water being pumped to the tanks) will be triggered in the control room and powerhouse for annunciation and immediate action by environmental/shift personnel.

In the event of power failure, pumps will have to be manually restarted from the control room so conditions can be inspected by personnel before a restart. The wet well will overflow the high flow weir and will alert personnel of a pump failure/overflow condition. The wet well is designed to provide for the addition of a future third pump in the event of site expansion requiring increased pumping capacity.

Please note that all precautions were taken and all designs reviewed with the City DPW to ensure that this system is environmentally sound and superior in every way to the past mode of operation.

Equalization Tanks:

Wastewater is equalized by being pumped into and through two tanks of a nominal volume of 1 million gallons each. These tanks and the wet well and pumps that feed them are located outside of the buffer zone prescribed in the Wetlands Protection Act.

The incoming wastestrems are mixed with submersible mixers so solids can be suspended, but not completely mixed. Connecting piping is designed so that the north tank is the lead tank during series operation. The system is designed so that one tank can be used, while the other is isolated for maintenance or cleaning. Wastewater coming into the tanks already received second stage treatment for neutralization and should be with the pH 6.5 to 7.0 range to ensure we will meet our permit limit for pH.

Tanks are designed with a high level overflow discharge to the dirty sewer system in the event that the normal discharge piping becomes clogged. An alarm sounds in the control room and the powerhouse to indicate high level and discharge through the overflow piping. Tanks have a large enough manway to permit safe entry of a person, plus some piping for tank cleanouts. Tanks have individual drains to the

dirty sewer to permit safe drainage of any tank for a shutdown. Under normal conditions, both tanks are used in a series arrangement. Isolation of any tank requires manual activation of a valve on the north to south connecting line and the installation of a line blank. Containment for the tank area is 10% of the tank capacity with drains in the containment back into the pump wet well. The containment is water tight.

Control Building and Control System:

A heated and insulated control building next to the wet well area houses the instrumentation, samplers and computer controls for monitoring the wastestreams. Sensing instruments are located at all key spots in the system.

The facility is managed by a trained supervisor who will work a normal day shift. Twenty-four hour, seven-day coverage of monitored alarms is provided. Shift system mechanics are trained to respond to any problem which may arise in the system.

Accurate measurement of the effluent flow leaving the system is provided by a 24" Parshall Flume located within the wet well structure. From there, the discharge effluent flows to the Ludlow Interceptor in a 32" line.

Discharge Line Details:

Effluent leaves the equalization system wet well through a Parshall Flume to measure the flow rate. At this point it enters a 32" effluent discharge line, the bottom of which is at elevation 127.74.

The line continues northward to a manhole (Manhole #2) and then turns eastward to parallel the river. After heading eastward for approximately 140 ft. the line again enters another manhole (Manhole # 1) and then turns northward again to intersect the Ludlow Interceptor.

For details of this run please see the Blasland and Bouck print, G-1. It is this line's tie-in to the Ludlow Interceptor which requires the sewer tie-in permit.